Gender Effects in Implicit Associations Towards Alcohol in Patients with Alcohol Use Disorder - Preliminary Results

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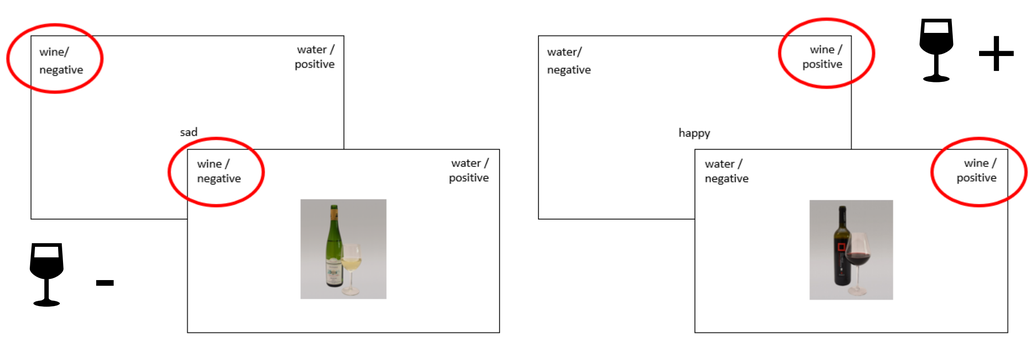
Background

- Current neuroscientific theories postulate an imbalance between enhanced automatic reaction towards alcohol and impaired inhibitory control as a significant factor in the development and maintenance of an alcohol use disorder (AUD) [e.g. 1].
- Implicit associations, as measured with the Implicit Association Test (IAT), could indicate the strength of such automatic reactions.
- Preclinical behavioral studies reveal that women and men differ in their implicit associations and that these associations predict the success of inhibition trainings [e.g. 2, 3].
- Neurophysiological findings in other research areas show ERP changes regarding implicit associations [e.g. 4, 5].
- Studies investigating the neurophysiological correlates of implicit alcohol associations and gender effects in patients with AUD are missing.

Implicit Association Test (IAT)



Implicit Association Task (IAT): During alcohol-positive blocks, the assignment of alcohol cues is consistently paired with positive words. In alcohol-negative blocks, alcohol cues and negative words share the same allocation.

Methods

66 abstinent inpatients with AUD attending a specialized treatment program were measured with a 64-channel EEG. All subjects completed an IAT to assess positive and negative implicit associations towards alcohol. During IAT, reaction time differences between two combinations of pictorial cues and words (alcohol-positive or alcohol-negative) are measured.

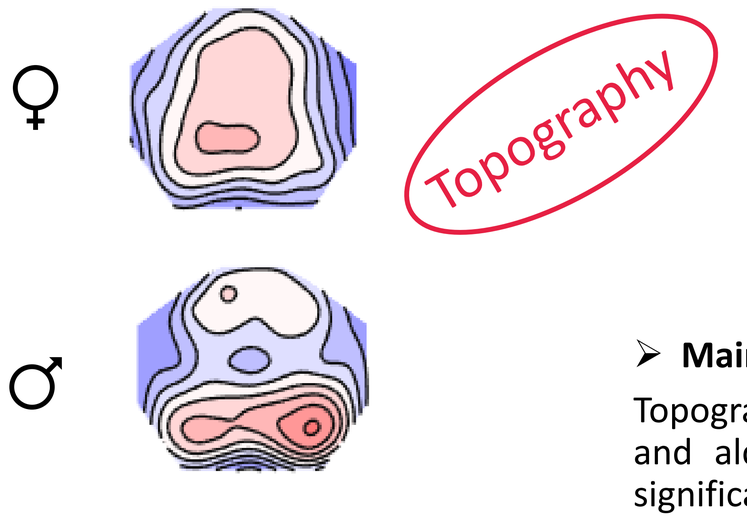
After preprocessing, all data was re-referenced to average reference, and two ERPs were obtained for each subject over all correct trials: Alcohol-Positive and Alcohol-Negative.

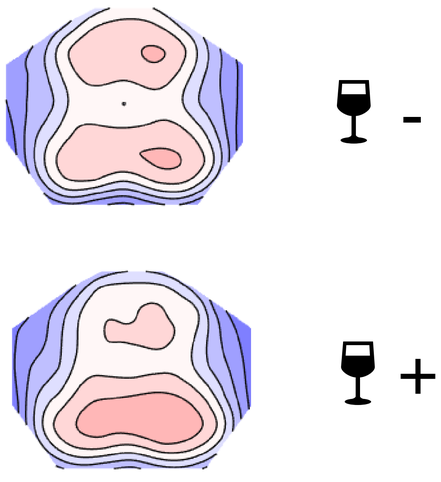
ERPs were filtered (0.5-20Hz, 50Hz notch), and no data outliers were identified. Furthermore, differences in map topography and map strength were examined from -500ms to 1500ms around stimulus: First, a 2x2 TANOVA with the between-factor **gender** (male, female) and the within-factor **valence** (alcohol-positive, alcohol-positive) was conducted to test for interactions. Second, GFP analyses were calculated for the same interactions.

Results

➢ **Main effect Gender (426 – 544ms)**

Men and women differ significantly in their topography.



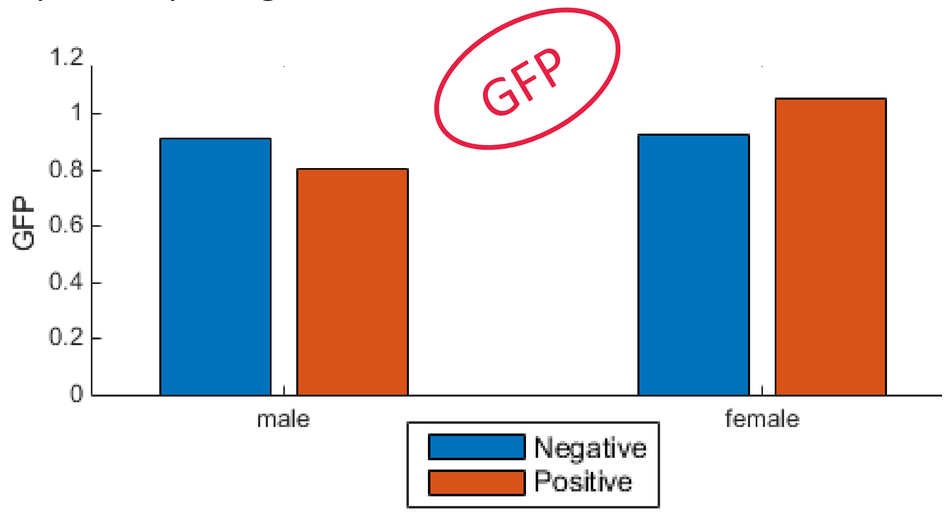


➢ **Main effect Valence (350 – 562ms)**

Topographies between alcohol-positive and alcohol-negative assignments vary significantly.

➢ **Interaction Gender x Valence (656-712ms)**

While men show higher GFP during the alcohol-negative assignments, women have higher GFP during alcohol-positive pairings.



Discussion

Neurophysiological gender effects of an Alcohol-Valence-IAT in AUD patients are examined for the first time.

During the late P3, women exhibit stronger frontal positivity, whereas men display a stronger lateralized posterior positivity. Further, alcohol-negative allocations show stronger frontal positivity than alcohol-positive assignments. This indicates that networks activated during the (late) P3 differ in terms of gender and valence.

Men show higher GFP during the alcohol-negative while women have higher GFP during alcohol-positive allocations. This indicates that in women with AUD, more activation during the processing of positive associations is required, whereas the opposite pattern occurs in men. In conclusion, women could have less positive associations towards alcohol than men, which is in line with previous research.

Outlook

- Comparison of patients and healthy controls
- Analyses of behavioral data
- Behavioral & neurophysiological change after an inhibition training

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Registration

ClinicalTrials.gov (NCT02968537)

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